K122472

510(k) Summary for VARIANT™ II TURBO HbA_{1c} Kit – 2.0

OCT 2 6 2012

This summary of 510(k) safety and effectiveness information is being submitted in accordance with the requirements of SMDA 1990 and 21 CFR 807.92.

The assigned 510(k) number is:_____.

Preparation Date: August 8, 2012

A. Applicant

Bio-Rad Laboratories, Inc.
Clinical Systems Group
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Hercules, CA 94547

Contact Person:
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B. Device Name and Regulatory Information

Proprietary Name: VARIANT™ II TURBO HbA_{1c} Kit – 2.0
Regulation section: 21 CFR 864.7470, Glycosylated Hemoglobin Assay
Device Classification: Class II
Product Code: LCP, Assay, Glycosylated Hemoglobin
Panel: Hematology

C. Predicate Device

VARIANT™ II TURBO HbA_{1c} Kit – 2.0 (k)090699

D. Intended Use

1. Intended Use:
   The Bio-Rad VARIANT™ II TURBO HbA_{1c} Kit-2.0 is intended for the quantitative determination of hemoglobin A_{1c} in human whole blood using ion-exchange high performance liquid chromatography (HPLC) on the VARIANT™ II TURBO Hemoglobin Testing System. Measurement of hemoglobin A_{1c} is effective in monitoring long term glycemic control in individuals with diabetes mellitus. The Bio-Rad VARIANT™ II TURBO HbA_{1c} Kit-2.0 is intended for Professional Use Only.

2. Indications for Use:
   Same as above

3. Special conditions for use statement(s):

For Prescription Use Only

4. Special instrument requirements:
   For use with the Bio-Rad VARIANT™II TURBO Hemoglobin Testing System

E. Description of Device:

The VARIANT II TURBO Hemoglobin Testing System uses the principles of high performance liquid chromatography (HPLC). The VARIANT II TURBO HbA_{1c} Kit – 2.0 is based on chromatographic separation of Hemoglobin A_{1c} on a cation exchange cartridge. The VARIANT II TURBO HbA_{1c} Kit – 2.0 contains an analytical cartridge, 5 prefilters, Elution Buffer A and B, Calibrator Level 1, Calibrator Level 2, Whole Blood Primer, sample vials and a CD-ROM with test parameters.

The VARIANT II TURBO Hemoglobin Testing System provides an integrated method for sample preparation, separation and the quantitative determination of HbA_{1c} in EDTA human whole blood. The VARIANT II TURBO Hemoglobin Testing System is a fully automated, high-throughput hemoglobin analyzer. It consists of two modules - the VARIANT II Chromatographic Station (VCS) and the VARIANT II Sampling Station (VSS). There have been hardware updates due to obsolescence of parts and firmware updates to support the replacement hardware components.

A personal computer is used to control the VARIANT II TURBO Hemoglobin Testing System using updated Clinical Data Management (CDM) software version 5.1.1.

F. Summary of the device technological characterizes:

The VARIANT II TURBO HbA_{1c}- 2.0 Kit and modified System have the same characteristics as the predicate, VARIANT II TURBO HbA_{1c}- 2.0 Kit (k)090699. Comparisons of features are provided in the table below:

Feature	**Predicate: Bio-Rad VARIANT™ II TURBO HbA_{1c} Kit -2.0 (k)090699**	**Modified device: Bio-Rad VARIANT™ II TURBO HbA_{1c} Kit -2.0**
Similarities		
Technology	Ion-exchange high performance liquid chromatography	
Sample type	Anticoagulated whole blood (EDTA)	
Calibrator	Human anticoagulated whole blood treated with EDTA	
Calibration frequency	Once every 500 injections/ 2500 injections total column life	
Certification	Certified by the NGSP as traceable to the Diabetes Control and Complications Trial (DCCT) Reference method.	
Certification	Certified by the IFCC as traceable to the IFCC Reference Measurement Procedure.	
Instrument Control	Windows Operating System with Proprietary Assay Software	
Kit configuration	One analytical cartridge, 5 prefilters, Elution Buffer A and B, Calibrator Level 1, Calibrator Level 2, Whole Blood Primer, sample vials and a CD-ROM with test parameters.	

<table>
<tr><th>Feature</th><th>Predicate:
Bio-Rad VARIANT™ II TURBO HbA_{1c} Kit -2.0
(k)090699</th><th>Modified device:
Bio-Rad VARIANT™ II TURBO HbA_{1c} Kit -2.0</th></tr>
<tr><td>Chemistry</td><td colspan="2">Cation Exchange Matrix</td></tr>
<tr><td>Safety Standards for Electrical Equipment for IVD Use</td><td colspan="2">BS EN 61010 Certified</td></tr>
<tr><td>Electromagnetic Compatibility</td><td colspan="2">BS EN 61326 Certified</td></tr>
<tr><td colspan="3">Differences</td></tr>
<tr><td>Reporting units</td><td>% HbA_{1c} (NGSP)</td><td>% HbA_{1c} (NGSP), mmol/mol HbA_{1c} (IFCC), or %HbA_{1c} (JDS)</td></tr>
<tr><td>Intended Use</td><td>Intended for the percent determination of HbA_{1c} in human whole blood using ion-exchange HPLC.
Measurement of percent HbA_{1c} is effective in monitoring long-term glucose control in individuals with diabetes mellitus.</td><td>Intended for the quantitative determination of HbA_{1c} in human whole blood using ion-exchange HPLC on the VARIANT II TURBO Hemoglobin Testing System.
Measurement of percent HbA_{1c} is effective in monitoring long-term glucose control in individuals with diabetes mellitus.</td></tr>
<tr><td>Interference from variants (HbD, HbE, HbS, HbC)</td><td>Hemoglobin variants: Two out of 7 hemoglobin AD-trait, 2 out of 11 hemoglobin AS-trait, 1 out of 12 hemoglobin AE-trait, and 3 out of 9 hemoglobin AC-trait patient samples at the clinically significant levels of 6% and 9% HbA_{1c} exhibited differences of more than ±10% from values obtained using boronate affinity reference method.</td><td>No significant interference was observed at the following concentrations:
• HbS ≤67%
• HbC ≤72%
• HbD ≤55%
• HbE ≤41%</td></tr>
<tr><td>Interference from HbA_2</td><td>No claim previously</td><td>β-thalassemia trait, as indicated by increased HbA_2 concentrations up to 10%, does not interfere with the assay.</td></tr>
<tr><td>Expected Range

From American Diabetes Association Standard of Care</td><td>Hemoglobin A_{1c} Ranges<table><tr><th>Hemoglobin A_{1c} (%)</th><th>Degree of Glucose Control</th></tr><tr><td>>8</td><td>Action Suggested</td></tr><tr><td><7</td><td>Goal</td></tr><tr><td><6</td><td>Non-Diabetic Goal</td></tr></table></td><td>Hemoglobin A_{1c} Ranges<table><tr><th>Hemoglobin A_{1c} (%)</th><th>Glycemic Goal</th></tr><tr><td><8</td><td>Less Stringent Goal</td></tr><tr><td><7</td><td>General Goal</td></tr><tr><td><6.5</td><td>More Stringent</td></tr></table></td></tr>
</table>

Feature	Predicate: Bio-Rad VARIANT™ II TURBO HbA_{1c} Kit -2.0 (k)090699	Modified device: Bio-Rad VARIANT™ II TURBO HbA_{1c} Kit -2.0
	From American Diabetes Association Standard of Care (2001)	<5.7 Non-Diabetic Goal From American Diabetes Association Standard of Care (2012)

Method Comparison:
This study was performed following CLSI guideline EP9-A2 Method Comparison and Bias Estimation Using Patient Samples. To demonstrate the correlation between CDM Software Versions 5.1 and 4.03, the VARIANT II TURBO HbA1c Kit – 2.0 was run on the VARIANT II TURBO Hemoglobin Testing System using both software versions. The protocol consisted of 100 EDTA whole blood human samples and 16 samples prepared by mixing EDTA whole blood samples with either purified HbA_O or purified HbA_{1c}. The samples were run as a single injection and the ranges of values are presented in Table 2 below.

The purpose of this study was to demonstrate that the modified version of software (v5.1) did not produce a clinically significant effect on HbA_{1c} results with the use of +/- 10% relative bias at 6% and 9% HbA_{1c} as evaluation limits. The Bias Estimation data is presented in Table 1 and acceptable error at the decision points were met. The linear regression correlation data is presented in Table 2.

Table 1: Bias Estimation at two Decision Points of $\%HbA_{1c}$ (NGSP)

Criteria	First Decision Point	Second Decision Point
Decision point	6.0 $\%HbA_{1c}$	9.0 $\%HbA_{1c}$
Predicted value by regression	6.01	8.99
Predicted bias by regression	0.2%	-0.1%
Upper 95% confidence limit	0.5%	0.1%
Lower 95% confidence limit	-0.1%	-0.3%

Table 2: Linear Regression Data

	Regression Equation	R^2	Sample Range
$\%HbA_{1c}$ (NGSP)	Y=0.99x + 0.06	0.999	3.5 – 19.5%
mmol/mol (IFCC)	Y=0.99x + 0.48		15-190 mmol/mol
$\%HbA_{1c}$ (JDS)	Y=0.99x + 0.06		3.1 – 19.3%

Analytical specificity:
Hemoglobin variant Interference study:

This study was performed following CLSI EP7 –A2: Guidelines Interference Testing in Clinical Chemistry; Approved Guidelines, Second Edition.

Two fresh, EDTA non-variant human blood sample pools at 6.5% and 8.0-9.0% HbA_{1c} were collected. Fresh, EDTA human homozygous blood samples for each of the 4 hemoglobin variants (e.g. E, D, S, and C) was obtained for dilution. For the interference testing of each variant, a series of test sample pools were prepared by the dilution of a homozygous variant patient sample (as interferent) in the non-variant patient sample pool. The samples were run in duplicate on two VARIANT II TURBO Hemoglobin Testing Systems. The conclusion of this study demonstrated that no interference was observed at the following concentrations: HbS $\leq$ 67%, HbC $\leq$ 72%, HbD $\leq$ 55%, and HbE $\leq$ 41%.

8. Conclusion:

When considering the similarities of the intended use, the general features and characteristics of the assay, the use of the same technology, it can be concluded that the VARIANT II TURBO HbA_{1c} Kit – 2.0 is substantially equivalent to the cleared and currently marketed predicate, VARIANT II TURBO HbA_{1c} Kit – 2.0 (k090699).

DEPARTMENT OF HEALTH & HUMAN SERVICES

Food and Drug Administration

10903 New Hampshire Avenue
Silver Spring, MD 20993

Bio-Rad Laboratories, Inc.
Clinical System Division
c/o Jackie Buckley
Regulatory Affairs Representative IV
4000 Alfred Nobel Drive
Hercules, CA 94547

OCT 26 2012

Re: k122472
Trade Name: VARIANT II TURBO HbA_{1c} Kit – 2.0
Regulation Number: 21 CFR §864.7470
Regulation Name: Glycosylated Hemoglobin Assay
Regulatory Class: Class II
Product Code: LCP
Dated: August 10, 2012
Received: August 14, 2012

Dear Ms. Buckley:

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to such additional controls. Existing major regulations affecting your device can be found in Title 21, Code of Federal Regulations (CFR), Parts 800 to 895. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Parts 801 and 809); medical device reporting (reporting of medical device-related adverse events) (21 CFR 803); and good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820).

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801), please contact the Office of In Vitro Diagnostic Devices and Radiological Health at (301) 796-5450. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR Part 807.97). For questions regarding postmarket surveillance, please contact CDRH'S Office of Surveillance and Biometric's (OSB's) Division of Postmarket Surveillance at (301) 796-576-. For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to http://www.fda.gov/Medical Devices/Safety/ReportaProblem/default.htm for the CDRH's Office of Surveillance and Biometrics/Division of Postmarket Surveillance...

You may obtain other general information on your responsibilities under the Act from the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800 638-2041 or (301) 796-5680 or at its Internet address http://www.fda/gov/MedicalDevices/ResourcesforYou/Industry/default.htm

Sincerely yours,

Courtney H. Lias, Ph.D
Director
Division of Chemistry and Toxicology
Office of *In Vitro* Diagnostics and
Radiological Health
Center for Devices and Radiological Health

Enclosure

Indications for Use

510(k) Number (if known): K122472

Device Name: VARIANT™ II TURBO HbA_{1c} Kit – 2.0

Indications for Use:

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Prescription Use __x_____ (Part 21 CFR 801 Subpart D) AND/OR Over-The-Counter Use _____ (21 CFR 801 Subpart C)

(PLEASE DO NOT WRITE BELOW THIS LINE-CONTINUE ON ANOTHER PAGE OF NEEDED)

Concurrence of CDRH, Office of In Vitro Diagnostic Devices (OIVD)

Division Sign-Off
Office of In Vitro Diagnostic Device
Evaluation and Safety

510(k) K122472